

## HEAT PIPE STRUCTURE

### BACKGROUND OF THE INVENTION

The present invention relates to a heat pipe structure, and more particular, to a heat pipe structure of which a wick structure is securely attached to an 5 interior wall of a tubular member during a sintering process.

Heat pipes have been commonly used for dissipating heat generated by electronic products. The heat pipes have high thermal conducting ability, high thermal transmission, high thermal conductivity, light weight, non-mobile device, simple structure and versatile applications. The conventional heat pipe 10 includes a wick structure attached to an interior wall of a tubular member. The wick structure includes a screen mesh with capillary function which is advantageous for transmission of working fluid in the heat pipe.

A sintering process is required to attach the conventional fiber-like wick structure to an interior wall of a tubular member of the heat pipe. During the 15 sintering process, the wick structure will be melted to affect the attachment. Therefore, a support member is typically applied to support the wick structure, so as to improve the attachment between the wick structure and the interior wall 20 of the tubular member. However, as the melting point of the support member as selected is not considered, the support member is often melted during the sintering process too. Therefore, the attachment between the wick structure and the interior wall of the tubular member is still very unstable. As a result, the 25 heat dissipation or conduction of the heat pipe is degraded.

Therefore, there is a substantially need to improve the attachment between the wick structure and the interior wall of the tubular member during the 25 sintering process.

### BRIEF SUMMARY OF THE INVENTION

The present invention provides heat pipe structure of which the melting points of the wick structure, the support member and the tubular member are different. Therefore, in the sintering process for attaching the wick structure to the tubular member, the support member will not be melted, and an improved 5 supporting effect of the support member is maintained. As a result, the wick structure is securely attached to the interior wall of the tubular member to provide a promising heat conduction effect.

The heat pipe structure provided by the present invention comprises a tubular member, a support member and a wick structure. The tubular member is 10 hollow to accommodate the support member and the wick structure therein. The wick structure is disposed between the support member and an interior wall of the wick structure. By the supporting function of the support member, the wick structure is attached to the interior wall of the tubular member. Further, the melting point of the wick structure is lower than those of the tubular member 15 and the support member. Therefore, in the step of sintering the wick structure, the support member will not be deformed to affect the attachment of the wick structure to the tubular member.

These and other objectives of the present invention will become obvious to those of ordinary skill in the art after reading the following detailed 20 description of preferred embodiments.

It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the invention as claimed.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 These, as well as other features of the present invention, will become apparent upon reference to the drawings wherein:

Figures 1 shows a first cross sectional view along an elongate direction of a heat pipe in a first embodiment of the present invention;

Figure 2 shows a cross sectional along a transverse direction of the heat pipe in the first embodiment;

5 Figure 3 shows a first cross sectional view along an elongate direction of a heat pipe in a second embodiment of the present invention; and

Figure 4 shows a cross sectional along a transverse direction of the heat pipe in the second embodiment

#### DETAILED DESCRIPTION OF THE INVENTION

10 Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

15 Figures 1 and 2 illustrate cross sectional views along an elongate direction and a transverse direction of a heat pipe provided as a first embodiment of the present invention. As shown, the heat pipe 1 includes a tubular member 10, a support member 11 and a wick structure 12. The tubular member 10 is hollow to accommodate the support member 11 and the wick structure 12 therein. An interior wall 100 is defined by the tubular member 10.

20 The support member 11 is disposed in the tubular member 10. In this embodiment, the support member 11 includes an elongate spiral member extending through the tubular member 10. As shown in Figures 3 and 4, the support member 11 can be either wire spiral or winding plate. In addition, the support member 11 may be perforated with a plurality of holes 110, allowing 25 the working fluid to flow through.

The wick structure 12 is in the form of a screen mesh or a fiber bundle disposed between the tubular member 10 and the support member 11. Being

supported by the support member 11, the wick structure 12 is attached to the interior wall 100 of the tubular member 10.

To firmly attach the wick structure 12 to the interior wall 100 of the tubular member 10, a sintering process is required. The sintering process 5 softens the wick structure 12 to be attached to the interior wall 100 of the tubular member 10. Preferably, the wick structure 12 is fabricated from materials with low melting point such as phosphorus bronze, while the support member 11 and the tubular members 10 are fabricated from materials with melting point higher than that of the wick structure 12. For example, the tubular 10 member 10 and the support member 11 can be fabricated from pure copper. The melting point of the support member 11 does not have to be as high as that of the tubular member 10. Therefore, during the sintering process, the wick structure 12 is softened to adhere to the interior wall 100 of the tubular member 10. Meanwhile, the rigid condition of the support member 11 is maintained to 15 proper support the wick structure 12. Therefore, a stable attachment of the wick structure 12 on the interior wall 100 of the tubular member 10 is obtained.

As the wick structure 12 has been properly attached to the interior wall 100 of the tubular member 10 during the sintering process, when the heat pipe is further processed into a specific configuration, the stable attachment of the wick 20 structure 12 is well maintained.

By the control of melting points of the wick structure 12, the tubular member 10 and the support member 11, the wick structure 12 is securely attached to the interior wall 100 of the tubular member 10. Therefore, the yield 25 of the heat pipe 1 is enhanced, and the heat conducting effect of the heat pipe 1 is improved.

This disclosure provides exemplary embodiments of the present invention. The scope of this disclosure is not limited by these exemplary embodiments. Numerous variations, whether explicitly provided for by the specification or

implied by the specification, such as variations in shape, structure, dimension, type of material or manufacturing process may be implemented by one of skill in the art in view of this disclosure.